(No Model.)

2 Sheets—Sheet 1.

# J. BATEY.

## SCREW CUTTING MACHINE.

No. 600,133. Patented Mar. 8, 1898.

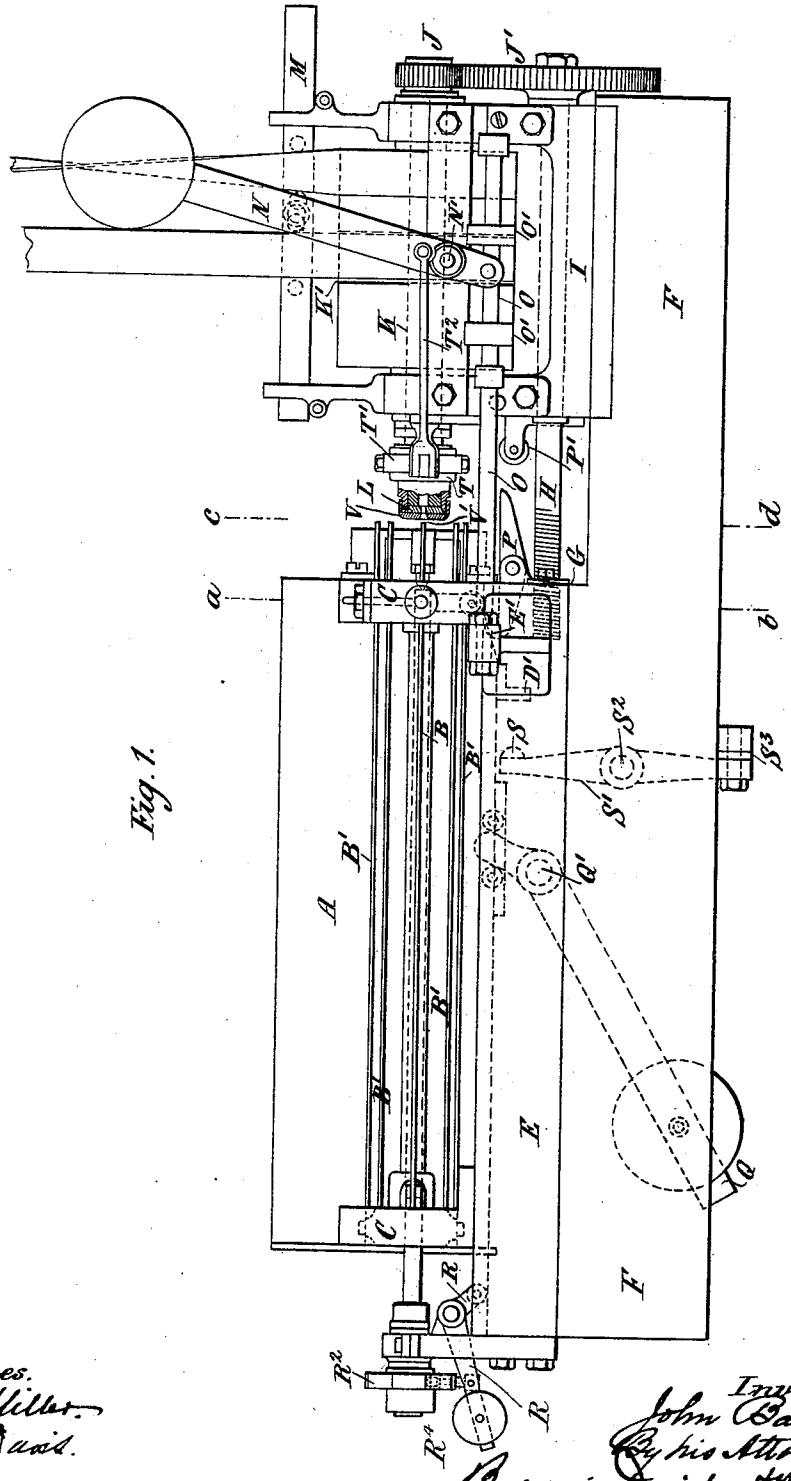


Fig. 1.

Witnesses.
B. F. Miller.
Guy E. Davis.

Inventor
John Batey,
By his Attorneys
Baldwin Davidson & Wright.

(No Model.)

2 Sheets—Sheet 2.

# J. BATEY.

## SCREW CUTTING MACHINE.

No. 600,133. Patented Mar. 8, 1898.

*Fig. 2.*

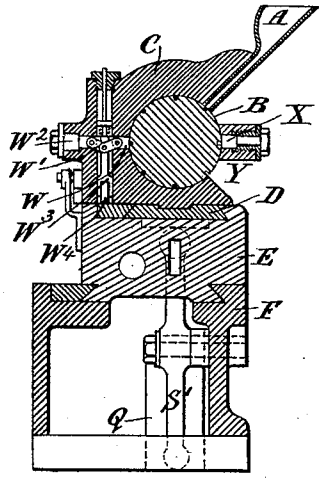



*Fig. 3.*

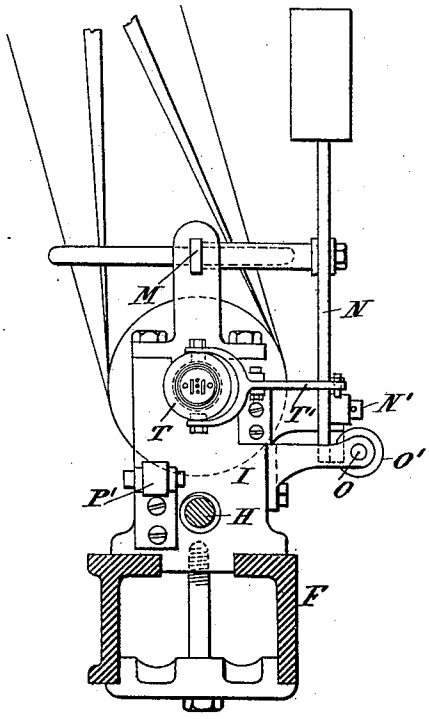



*Fig. 4.*

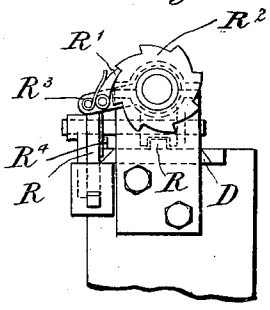
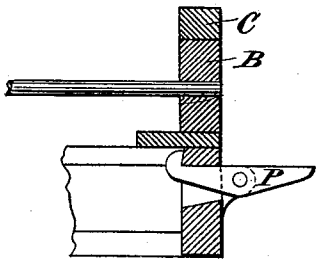



*Fig. 5.*




Witnesses.
B. W. Miller.
Guy E. Davis.

Inventor.
John Batey,
By his Attorneys
Baldwin Davidson & Wright.

# UNITED STATES PATENT OFFICE.

JOHN BATEY, OF DUBLIN, IRELAND.

## SCREW-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 600,133, dated March 8, 1898.

Application filed October 2, 1897. Serial No. 653,784. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BATEY, a subject of the Queen of Great Britain, residing at 47 Heytesbury street, Dublin, Ireland, have invented certain new and useful Improvements in Screw-Cutting Machinery Applicable Especially for Cutting Screw-Threads on One End of Wire Spokes for Wheels, of which the following is a specification.

In screw-cutting machinery constructed according to this invention the wires upon one end of which a screw-thread is to be cut are placed into a hopper, from which they pass one by one into grooves cut longitudinally along the circumference of a roller to which a step-by-step revolving motion is imparted, one of the grooves in the roller being brought at the end of each partial turn below the hopper, so that a wire may drop into it. As the roller turns, the wires in the grooves are carried round with it and are brought one by one into a position in which the wire is nipped and thereby locked and prevented from turning within the groove. After each time that a wire has been brought into this position the roller has an endwise movement given to it, and the end of the wire which is so prevented from turning is presented to a pair of revolving screw-cutting dies which cut a screw-thread upon it. When a screw-thread of the desired length has been cut, the dies are made to open, so as to be free from the screw-thread cut on the wire, and the roller is then moved back endwise away from the dies, carrying the wire back along with it. Another partial turn is given to the roller, and ultimately the wire upon which a screw-thread has been cut is brought round to a point where the wire is free to drop away from the groove in which it was lying and is delivered from the machine.

The drawings annexed show a machine constructed in the above manner.

Figure 1 is a side elevation, partly in section, of the machine. Fig. 2 is a cross-section on the line *a b*, looking to the left; Fig. 3, a cross-section on the line *c d*, looking to the right; Fig. 4, an end view of the mechanism for giving a step-by-step rotating movement to the roller B, and Fig. 5 a longitudinal section showing the catch for coupling together the two slides.

A is the hopper into which the lengths of wire are placed. The hopper has a thin throat or delivery end in which the wires lie horizontally in a single layer one above the other.

B is a roller in close proximity to the bottom end of the throat, along the circumference of which a number of grooves are cut longitudinally, each of a depth and size for a single wire B′ to lie in. The roller may be a complete roller or, as shown, a hollow spindle with disks at its two ends, the grooves for the wires being formed in the circumference of the disks. The roller is of shorter length than the hopper and the wires contained in it, so that each wire as it lies in a groove in the roller may extend beyond one of its ends. Each end of the roller is surrounded for the greater part of its circumference by a cylinder C, which keeps the wires in the grooves as they are carried around by the step-by-step rotation which the cylinder receives. The cylinders are cut away where the hopper-mouth passes through them and where the wires after having had a screw-thread cut on one of their ends are to be discharged from the grooves in the roller in which they lie. The two cylinders C, the hopper A, and the bearings for the axis of the roller B are fixed on the top of a slide D, which can be moved endwise to and fro along the top of a second slide E, which can also be moved endwise to and fro along guides on the fixed bed F of the machine. It receives this endwise motion by a nut G, fast upon it, engaging with a screw-thread on the end of a spindle H, which is carried in bearings in a frame I, fixed to the bed of the machine, and which spindle is revolved first in one direction and then in the opposite direction. It receives these movements, through gear-wheels J, from a second spindle K, also mounted in bearings upon the frame. This second spindle may be driven at one time in one direction and at another time in the opposite direction in any suitable manner; but preferably I drive it by a fast pulley K′, having a loose pulley on either side of it, so that the fast pulley may be driven either by a crossed or an uncrossed belt moved onto it. This second spindle K also carries on its end which is toward the slides D and E, above men-

tioned, a chuck carrying screw-cutting dies L, which are to cut the screw-thread on the ends of the wires.

To shift one belt off the fast pulley K′ and bring the other one onto it, forks on a sliding bar M may be used in the ordinary way. The bar M is moved endwise in one direction or the other at the proper time by a lever N, weighted at the top and turning on a fulcrum N′ near its lower end. An extension of the lever below the fulcrum is acted on alternately by two collars O′ on a rod O, which extends from the lower sliding carriage E. As this carriage completes its movement in one or other direction one of the collars comes against the lower extension of the lever and turns the lever until the weighted upper end of the lever passes the vertical. The weight then continues the turning movement of the lever and shifts the bands, so changing the direction in which the spindles are driven.

When both sliding carriages are at the extreme end of their travel away from the screw-cutting dies, a spring-catch P locks the two slides together, so that when the lower carriage E is again moved toward the screw-cutting dies the upper carriage D travels along with it. The end of one of the wires carried in one of the grooves of the roller is so brought up to the screw-cutting dies which are revolving and has a screw-thread cut upon it.

As the lower carriage completes its movement toward the screw-cutting dies it commences to turn the weighted lever, as above explained. This movement of the lever first causes the screw-cutting dies to be moved apart, so that they no longer engage with the screw-thread cut on the end of the wire. Afterward an incline on the tail end of the spring-catch P, which locks the two carriages together, comes against a roller P′ and the catch is tripped. The upper carriage D is then at once drawn back away from the screw-cutting dies, carrying the wire back with it. This movement may be given to the carriage in any suitable manner. In the drawings it is shown to be effected by a weighted lever Q acting upon it. This lever is pivoted at Q′ to the lower carriage E. As the carriage completes its backward movement it causes a partial turn to be given to the grooved roller B. It comes against and partially turns a two-armed weighted lever R, and by a pawl R′, actuated by the lever acting upon a ratchet-wheel $R^2$, fast on a spindle which passes telescopically into the spindle of the grooved roller, gives a partial turn to this roller, so as to bring an empty groove in it below the hopper A. The pawl R′ is carried by an arm $R^3$, free to turn around the spindle, and this arm is coupled by a link $R^4$ to the weighted arm of the lever R.

S is a stop against which a bar D′, fixed on the upper carriage D, strikes when this carriage comes to the end of its backward movement. The stop S is at the upper end of a lever S′, which at $S^2$ turns on a fulcrum carried by the fixed bed of the machine. The lower end of the lever rests against the fixed block of elastic material $S^3$, so as to avoid shock.

As soon as the weight on the upper end of the lever N has passed beyond a vertical position the weight causes the lever to continue the turning movement which was being given to it and shifts the driving-belts so that the pulley K′, which before was being driven in one direction by one belt, is now driven in the opposite direction by the other belt. This causes the lower carriage E to be moved back slowly by the screw-spindle H, and when it has completed its backward movement the spring-catch P again locks the two carriages together and so the movements go on.

In order that the screw-cutting dies L may be moved apart just before the sliding carriages D and E complete their forward movement, the end of the spindle K, which carries the dies, is surrounded by a sliding collar T, which has inclines on the interior of its outer end, which when the collar is slid outward along the spindle act upon inclines on the two half-dies L and press them together. When the collar T is moved in the opposite direction, the two halves of the dies are pressed apart by the action of springs. The collar receives its endwise to-and-fro movement from a forked lever T′, which is connected by a connecting-rod $T^2$ to the weighted lever N used for shifting the belts.

A cylindrical cap V, forming the front portion of the chuck which carries the screw-cutting dies, forms a support for the front end of the sliding collar T to keep it from being bent out of form by the pressure on the inclines. The front of the cap has a bell-mouthed hole V′ formed centrally through it, which forms a guide to guide the ends of the wires to the screw-cutting dies.

During the time that the screw-thread is being cut on the end of one or the other of the wires the wire is clamped and held within the groove, so that it cannot turn. This is effected by the groove in which the wire lies, having at this time been brought opposite to the end of a radial slide W, which lies in a groove in the cylinder C, which embraces the front end of the roller B. The slide W is jointed to one end of toggle-levers W′, the opposite end of which is jointed to a fixed but adjustable pin $W^2$ on the cylinder. The central joint of the toggle-levers has a rod $W^3$ extending downward from it through guides and carrying a roller $W^4$ at its lower end. As the lower slide completes its backward movement an incline E′ upon it comes under the roller $W^4$ and lifts it, thereby straightening the toggle-levers and thrusting the radial slide W inward and causing it to clamp the wire, and the wire remains so clamped so long as the two carriages remain locked together, but is released shortly after the upper carriage D commences to make its backward movement. As the radial slide W

is pressed against the wire on one side of the roller B the opposite side of the roller rests against a fixed but adjustable support X, carried by the cylinder C. The axis of the roller B is thus relieved of all sidewise strain. After a wire has thus had a screw-thread cut on its end it is by the subsequent step-by-step turning movements of the roller B carried round to a point at Y, where the cylinders C are cut away. The wire then being no longer retained in the groove in which it was lying drops away and is discharged from the machine.

The back cylinder C and the back disk of roller B are made adjustable along the slide D and the spindle of roller B to suit varying length of wire to be screwed.

To increase the amount of work that can be performed by the machine, the mechanism above described may be duplicated, the spindle K carrying screw-cutting dies at each of its ends and the spindle H also formed with a screw-thread at each end to actuate the lower slides E of two sets of mechanism for feeding wires up to the screw-cutting dies. Thus when one feed mechanism is carrying forward a wire to one pair of screw-cutting dies the other feed mechanism will be moving away from the other pair of screw-cutting dies.

What I claim is—

1. The combination of the hopper, the grooved roller, the slide by which it is carried, mechanism for giving a step-by-step revolving movement to the roller, and for giving an endwise movement to the slide after each turning movement of the roller is completed, the revolving screw-cutting dies to which the end of one of the wires carried by the roller is presented each time that the slide moves forward and mechanism for gripping this wire and preventing it from turning while it is being acted on by the screw-cutting dies.

2. The combination of the hopper, the grooved roller, the upper slide by which it is carried, the lower slide along which the upper slide can be moved endwise, means for imparting a slow endwise movement to the lower slide first in one direction and then in the other, the catch for locking the two slides together, the weight or spring for drawing back the upper slide when the catch is released, the revolving screw-cutting dies and means for opening the screw-cutting dies and for then tripping the catch just before the lower slide completes its forward movement.

3. The combination of the hopper, the grooved roller, the upper slide by which it is carried, the lower slide along which the upper slide can be moved endwise, the revolving screw for imparting movement to the lower slide, the catch for locking the two slides together, means for drawing back the upper slide when the catch is released, driving mechanism for imparting a revolving movement to the screw first in one direction and then in the other, and means for reversing the action of this mechanism at the end of the forward-and-backward movement of the lower slide.

4. The combination of the hopper, the grooved roller, the upper and lower slides, the revolving screw for imparting movement to the lower slide, the catch for locking the two slides together, means for tripping this catch just before the lower slide completes its forward movement and for then drawing back the upper slide, the revolving screw-cutting dies, the gripping mechanism for holding each wire as it is presented to the screw-cutting dies, mechanism for imparting a revolving movement to the screw first in one direction and then in the other, the weighted tumbling lever for reversing the action of this mechanism and projections from the lower slide acting on the tumbling lever to throw it over as the lower slide completes its endwise movement in either direction.

5. The combination of the hopper, the grooved roller, the upper and lower slides, the revolving screw for imparting movement to the lower slide, the catch for locking the two slides together, means for tripping this catch just before the lower slide completes its forward movement and for then drawing back the upper slide, the revolving screw-cutting dies, means for opening these dies just before the catch is tripped, the gripping mechanism for holding each wire as it is presented to these dies, and means for giving a partial turn to the roller as the upper slide completes its backward movement.

6. The combination of the hopper, the grooved roller, the upper and lower slides, the revolving screw imparting movement to the lower slide, the catch for locking these two slides together, means for tripping this catch just before the lower slide completes its forward movement and for then drawing back the upper slide, the revolving screw-cutting dies, the gripping mechanism for holding each wire as it is presented to the screw-cutting dies, mechanism for imparting motion to the screw first in one direction and then in the other, the weighted tumbling lever for reversing the action of this mechanism, projections on the lower slide for throwing over the tumbling lever, the collar sliding endwise on the axis carrying the screw-cutting dies, the lever giving an endwise movement to the collar and the link connecting this lever to the weighted tumbling lever substantially as described.

JOHN BATEY.

Witnesses:
JAMES CARSON,
JAMES CARLYLE.